

“THE DEVELOPMENT OF THE COGNITIVE CODE-LEARNING THEORY”

—Trends in Language Methodology
in the United States—

Fumiko Tamura

I. Psycholinguistics – Psychological Study of Language and Speech

Psycholinguistics is an interdisciplinary study which brings together psychological and linguistic tools to understand the mental processes underlying the acquisition and use of language. The ultimate purpose is to look into the problems of the nature and development of the human mind. Linguists are interested in the structure of language, which includes speech sounds and meanings, and the system of grammar, which relates these two. Psychologists, on the other hand, are engaged in the study of the acquisition and the function of such systems. In acquisition and use of language, it is essential to have the underlying knowledge and abilities, which reflect on overt behavior. The careful study of the overt behavior of speaking and understanding speech enables one to account for such unobserved behavior. The distinction between overt behavior and underlying structure can be explained in the concepts of “language” and “speech.” Speech, which consists of meaningful sounds, is behavior; whereas language is knowledge. The field where these two are dealt with is truly interdisciplinary. For, the study of behavior has to be done in accordance with a theory of the structure of that behavior in which it is manifested, and vice versa. This eventually leads to the discussions of linguistic “competence” and “performance,” that is, one’s capacity to speak and understand and concerning what one actually does.

II. The Study of Transformational Generative Grammar in Terms of Psycholinguistics

In 1957, Norm Chomsky of the Massachusetts Institute of Technology heralded the beginning of the challenges posed to traditional linguistics and psychology by introducing transformational grammar in "Syntactic Structures."¹ It is especially in the field of grammar that modern linguistics has had a significant impact on psychology. In the early 1960's, there was a group of scholars devoting themselves to the field of psycholinguistics. George Miller and his students at Harvard's Center for Cognitive Studies began to probe transformational grammar in the context of the psychological laboratory. Eric Lenneberg, also at Harvard, was exploring the biological foundations of human language. Roger Brown and his colleagues at Harvard, Susan Ervin-Tripp and Wick Miller at Berkeley, and Martin Braine at Walter Reed in Maryland did the pioneering studies on language development in the child, which became the focus of psycholinguistic investigation.

III. The Place of Grammar

1. Prescriptive grammar vs. descriptive grammar

Prescriptive grammar is the rules of how people ought to speak and write language, whereas descriptive grammar describes the knowledge which people must have in order to speak and understand language. It is the latter that is important in the sense that it may give us the solution to the problems of the nature of the human mind. Grammar, which is a group of rules governing language, connects the speech sounds and the meanings. Only with this same underlying knowledge of the grammar of a language, can two people communicate each other.

The part of grammar called syntax deals with the word order which is essential for language productivity. The question of how people can create and understand an infinite number of new sentences is the most important aspect of language acquisition. If we learn a set of rules, that is, grammar, with which we can extend and, at the same time, apply our previous experiences in language acquisition, it is possible to understand and create an unlimited number of sentences. In the process of a child learning his first language, he acquires knowledge which enables him to understand much more than

what he has actually heard or learned. The focal point of psycholinguistics is to clarify the nature and development of this capacity.

Quoting from “Language and Unconscious knowledge”²² by Norm Chomsky, he says:

“Although the language generated is infinite, the grammar itself is finite, represented in a finite brain. Thus, the rules of grammar must iterate in some manner to generate an infinite number of sentences, each with its specific sound, structure, and meaning. We make use of this ‘recursive’ property of grammar constantly in ordinary life. We construct new sentences freely and use them on appropriate occasions, just as we comprehend the new sentences that we hear in novel circumstances, generally bringing much more than our knowledge of language to the performance of these creative acts.”

2. Phrase structure grammar vs. transformational grammar

Phrase structure grammar is based on rules of formation with which to rewrite symbols into other symbols, while Chomsky and his followers have developed an additional level based on rules of transformation, which are rules for rearranging elements. Let us consider the following two sentences, just to briefly look at the contrast between the two:

“John is easy to please.” and “John is eager to please.” John is the object of the first sentence which can be paraphrased as “Someone pleases John.” Conversely, in the second sentence, paraphrased as “John pleases someone,” John is the subject. Although, on the surface, the two sentences have similar structures, at a deeper level, they have different meanings. With phrase structure grammar, the rules do not adequately reveal the difference. With transformational grammar, however, it is possible to transform the surface structure of sentence into a deeper structure which reveals underlying meanings.

IV. Language and Cognition – “Do People Who Speak Different Languages Think in Different Ways?”

1. Thought and speech

It is worthwhile to introduce two opposing answers to the ancient question of “Are thought and speech inseparable?” John B. Watson,³³ the father of American behaviorist psychology gave an affirmative answer to the question, as he believed that thought was no more than covert speaking. On the contrary, Jean Piaget⁴¹ and his colleagues in Geneva, Switzerland, who carried out work on cognitive development, were opposed to the American behaviorist. They maintained that in the child’s language, cognitive development

proceeds on its own, followed by linguistic development. The child's intellect grows through interaction with the things and the people in his environment. Language, however, does not per se bring about cognitive growth. Piaget, a cognitive psychologist, is concerned with language, which has inner linguistic and cognitive structures, and thought. To him, this inner use of language need not always be reflected in speech, which is the articulatory movements of the vocal apparatus.

2. Storage and retrieval of memory

There are some interesting findings concerning a child's development of cognition in view of storage and retrieval of memory. Memories of one's very early childhood are difficult to retrieve, not because they are not stored at all, but because of certain cognitive reasons. This reveals an important role played by language in memory. Generally, a child who is less than two years old has not yet developed linguistic competence adequate enough to store memory. Another reason is that an adult is capable of using his ability to talk in order to store his memory, which can be recalled or retrieved linguistically. On the other hand, such verbal description is not yet available for interpretation or re-coding of a child's early experiences.

V. Cognitive Development and Memory – A Dichotomy between Instructive and Naturally-Developing Cognitive Growth in Language Acquisition

Memory is the act of internally coding one's experiences. The child in his early years relies on the proximity senses, such as smell, taste, and touch, and later on the distance senses such as sight and hearing. Language does not embrace all the cognition we develop. It is simply not enough to en-code one's experiences. The problem of cognition in a child's linguistic development has been a major issue among leading psycholinguists around the world.

Behavioristic psychologists regarded first language learning as a form of human behavior which could be reduced to the laws of conditioning. On the other hand, the present-day psycholinguists maintain that a child, with his innate and intrinsic capacities, develops first, "passive" grammar, namely, understanding some grammatical patterns, and then "active" grammar, namely, production. Until he starts to put two or more words together to make a sentence, it is impossible to study his active grammar, which generally happens when he becomes about a year and a half old. The most significant

fact that they have discovered is that the child develops his own system of grammar at the stage of "two-word sentences," which is not a mere reduced copy of that of the adult's.

The American psycholinguists lay an emphasis on training and instruction in cognitive development; while Piaget et al. stress the role of naturally-developing cognitive growth as the child interacts with his environment. The former maintain that children must have a formal education in school in order to use language. Bruner⁵⁾ suggested that school education is considered to be an important determiner for the use of language to facilitate cognitive growth. As far as children's cognitive growth is concerned, intellectual training which school children receive proves to be more important than the knowledge of the language they learn to speak.

This fact goes to show that there is a significant association between social communication and language acquisition. The speech of a child as well as an adult is a means of social contact in origin, that is to say, that it can be classified as communicative speech, or an act. Communicate adequately is closely bound up with cognitive development in general. Bernstein (1972),⁶⁾ in regard to sociolinguistic theory, stated that communication and control in child-rearing and schooling play an important role in developing the child's use of language. It is evident that unless the child has reached cultural-social-linguistic maturity, his full-fledged cognitive development cannot be expected. Furthermore, it is frequently alleged that the function of language is communication, that its essential purpose is to enable people to communicate with one another. It is further alleged that only by attending to this essential purpose can we make any sense of the nature of language. In recent years, communicative competence is stressed in the field of methodology, and the subsequent result is the "communicative approach," or "functional approach."

VI. Development of Grammar in a Child – Rule-Governed Behavior to Creative Performance Based on Competence

A general theory of acquisition of speech acts, which is a system of syntactic, semantic and phonological structure, has been the center of linguistic investigation for more than a decade or so. The child's syntax can become accessible when he begins to combine two or more words. However, "one-word sentences" sometimes can have the meaning of an entire sentence, depending upon the situation. For, when he speaks, he has an intention behind his utterance. At the most primitive stage of a child's speech

acts, it is most likely “performative,” that is, the combination of an utterance and an action in the form of identifying objects, request and question. The way present-day psycholinguists analyze the child’s acquisition of his first language is very different from that of behavioristic psychologists in that the former argue that a child creates his language with innate and intrinsic capacities, while the latter maintain that the child’s language develops with repetition and reinforcement.

VII. Language Acquisition – Psychology of Learning

1. The process of acquiring a foreign language

The psychology of learning a second or a foreign language as opposed to that of learning one’s mother tongue differs greatly. The mother tongue is the only medium of communication between a child’s inner thought and the outside world which he can rely on when need arises for him to get something or to ask questions. On the other hand, foreign-language study was, until quite recently (and to some extent still is), considered to be more or less for prestige rather than for practical purposes, and left for those who could afford to receive higher education and to pursue scholastic research with the help of various kinds of reference books which are normally written in foreign languages. Foreign language was, therefore, merely a tool for those who were after acquisition of the knowledge of foreign literature, philosophy, medicine, science, etc.

However, in the past decade or two, more and more communication among nations has been apparent, as a result of a rapid increase in international trade, diplomatic relations, sports, cultural and educational exchange programs, tourism, etc., boosting the need of understanding and speaking rather than reading and writing foreign languages. In consequence, trying to teach the skills of listening and speaking was emphasized, hence, the “aural-oral” method, subsequently called “audiolingual,” came into being. The founders of the audiolingual method were some of the structural linguists and cultural anthropologists who were working together with the behaviorist psychologists. Their stand, which was to investigate human behavior scientifically and objectively, led to a descriptive approach of the study of language. They maintained that language is a living thing, and not a static corpus of forms and expressions, but evolves as it is spoken.

2. Objective of the acquisition of foreign language

The six classes of objectives which American linguists set out to achieve are as

follows:⁷⁾

1. to develop the student's intellectual powers through foreign-language study;
2. to increase the student's personal culture through the study of the great literature and philosophy to which it is the key;
3. to increase the student's understanding of how language functions and to bring him through the study of a foreign language to a greater awareness of the functioning of his own language;
4. to teach the student to read the foreign language with comprehension so that he may keep abreast of modern writing, research, and information;
5. to bring the student to a greater understanding of people across national barriers by giving him a superpathetic insight into the ways of life and ways of thinking of the people who speak the language he is learning;
6. to provide the student with skills which will enable him to communicate orally, and to same degree in writing, with the speakers of another language and with people of other nationalities who have also learned this language.

VIII. Cognitive Code-Learning Theory Compared to the Audiolingual Approach

The audiolingual method is based on behaviorist psychology and structural linguistics and views language as behavior. The emphasis is laid on the repetition of “pattern drills” and the conditioning process. The belief is that it is “analogy” rather than “analysis” that provides better foundation for foreign language learning. The psychological basis of this method is, therefore, “memorization and manipulation of patterns which bring out partial resemblances, or similarities of structure, beneath surface variations of vocabulary.”⁸⁾ Another foundation of the method is that the spoken form of language must be mastered before the written form, with internalization of language habits as the objective.

Gestalt psychology and transformational linguistics form the basis of the cognitive code-learning theory. According to Carroll,⁹⁾ the psychological theories emphasize the following principles:

1. The frequency with which an item is contrasted with other items is more important than frequency of repetition.
2. The more meaningful the materials with which the student works the greater the facility in retention.

3. Materials presented visually are more easily learned than comparable materials presented aurally.

4. Conscious attention to critical features and understanding of them will facilitate learning.

As opposed to the audiolingual method, the stress is laid on acquisition of conscious control of the patterns through study and analysis, rather than analogy. Understanding of the structure is considered to be more important than facility of using it. Mueller explains the difference as follows:¹⁰⁾

Transformational linguists view language as an abstract system. To them it is rule-governed behavior. They insist on the innovative aspect of language, and attach no particular importance to the pre-eminence of speech over writing. The exercises developed under the influence of such linguistic principles go beyond habit formation, and insist on understanding of the language code. They aim at increasing the student's repertory of choices among the various patterns and at imparting a sensitivity to the meaning of patterns. Specifically, the presentation of the grammatical system undergoes an essential modification. The structures are presented as a related system from the top, that is, from the sentence pattern level down to the morphemic level. It is posited that, in this way, the student will be more readily induced to the language system and will internalize the rules that govern the target language. In terms of Gestalt psychology, he is taught to perceive structural relationships, called "transposition," as opposed to transferring similar elements by the process of analogy.

Mueller also reports that the following changes were made when French courses were taught according to cognitive code-learning principles at the University of Kentucky (1966-1969):¹¹⁾

In class

(a) The grammatical explanations in the lectures were based on the "Basic Patterns" as the integrating feature. Much more time and effort was spent explaining the patterns than had been the case before. The charts used in class were also handed out in dittoed form with the needed explanations for further study at home.

(b) The class work in the recitations was devoted to those exercises which tended to make the student generate sentences rather than manipulate them, to contrast a sequence of patterns rather than to repeat a single pattern.

Homework

(a) The speaking-writing sequence, essential in audiolingual theory, was gradually changed to a writing-speaking sequence. The students were told to write out a number

of responses to each exercise as homework prior to coming to the language laboratory.

(b) Confirmation of each response, which, in the audiolingual course, had been available in print in the right hand column of each page, was now available to the student after he made his response.

(c) Writing received much greater emphasis than in the audiolingual course. In the order in which it was used in the learning process, it contributed to cognitive code-learning.

IX. Conclusion

So far, the present writer has very briefly summarized the works of a few of the psycholinguists active during the past two decades with special attention to transformational grammar, which influenced drastically the methodology of teaching second or foreign languages, by contrasting the audiolingual method and the cognitive code-learning theory in terms of their bases and assertions.

As a conclusion, the writer believes that the cognitive code-learning theory is not necessarily superior to the audiolingual method in all areas of foreign language teaching. Rather, it is obvious that in some areas audiolingual pattern drills are more effective particularly in teaching phonology to the less able students. It is recommendable that a combination of exercises based upon both audiolingual and cognitive code-learning principles be used in courses if the students show any weakness in listening comprehension or speech. Especially those who have difficulty in remembering sounds and associating them with their symbols can be greatly benefited by operant conditioning. Furthermore, in the future, individualized learning with tailored programs is necessary particularly in language laboratories. It is clear that teaching materials used for a certain type of students do not always suit another type of students. The teaching materials tailored to the individual's aptitude - so-called student-oriented - ensure the best learning conditions.

APPENDIX

Piaget, Jean (1896–1980), a Swiss psychologist, developed a theory of child development known as genetic epistemology. This theory has had a wide impact, not only on psychology and education, but also on fields as diverse as linguistics and physics. Genetic epistemology is the study of how a child acquires and modifies abstract ideas, such as the concepts of causality, space, time, force, and morality. Piaget's methods involve questioning children as well as observing their behavior. His so-called conservation tasks have been highly influential and are now used by investigators all over the world.

BIBLIOGRAPHY

1. Chomsky, Norm "Syntactic Structures" The Hague: Mouton (1957)
2. Chomsky, Norm 'Language and Unconscious Knowledge' in "Psychoanalysis and Language" Psychiatry and the Humanities, Volume 3, Editor Joseph H. Smith, M. D.: Yale University Press (1978) pp. 7–8
3. Watson, John B. 'Psychology as the Behaviorist Views It' in "Psychological Review" (1913)
4. Piaget, Jean "The Language and Thought of the Child" New York: Meridan (1955)
5. Bruner, Jerome S. et al. "Studies in Cognitive Growth" New York: John Wiley & Sons, Inc. (1966)
6. Bernstein, Basil 'A Socio-Linguistic Approach to Socialisation: With some Reference to Educability' in J. J. Gumperz & Hymes (Eds.) "Directions in Sociolinguistics" New York: Holt, Rinehart & Winston, Inc. (1972)
7. Rivers, Wilga M. "Teaching Foreign-Language Skills" The University of Chicago Press (1970) pp. 8–9
8. Rivers, Wilga M. "The Psychologist and the Foreign-Language Teacher" Chicago: University of Chicago Press (1964) p. 117
9. Carroll, John B. 'The Contributions of Psychological Theory and Educational Research to the Teaching of Foreign Languages' in Valdman "Trends" (1966) pp. 104–105
10. Mueller, Theodore H. 'The Effectiveness of Two Learning Models: The Audio-Lingual Habit Theory and the Cognitive Code-Learning Theory' in "The Psychology of Second Language Learning" Papers from the Second International Congress of Applied Linguistics; Cambridge 1969, Edited by Paul Pimsleur and Terence Quinn: Cambridge University Press (1975) p. 114
11. Ibid. pp. 119–120